

Serial No. 10/067,562

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In the Claims

Please amend the claims as follows:

1. (Currently Amended) Method for the fragmentation (F) of images (14i) into homogeneous regions (Ri), this fragmentation (F) using iterative merges of fragments  $F_i$  and  $F_j$  which are as similar as possible according to at least one selection parameter, this similarity being evaluated by a product  $A*B$  of two factors A and B, A being consistent with a number of pixels and B being consistent with the selection parameter(s), characterized in that a merge is performed when the product  $A*B*C$  is less than a threshold consistent with the selection parameter, C being a factor consistent with the inverse of a mean number of pixels of the fragments  $F_i$ .

2. (Original) Method according to Claim 1, characterized in that C is proportional to  $2/N_m$  where  $N_m$  represents a mean size of the fragments  $F_i$ , such as a mean number of pixels.

3. (Original) Method according to Claim 1, characterized in that the selection parameter(s) is (are) at least one of the following parameters: the luminance, the chrominance and the texture.

4. (Original) Method according to Claim 1, characterized in that each iterative merge relates only to two neighboring fragments  $F_i$  and  $F_j$ .

5. (Original) Method according to Claim 4, characterized in that factor A is proportional to  $(N_i*N_j)/(N_i+N_j)$ , where  $N_i$  and  $N_j$  are representative of the size of each merged neighboring fragment  $F_i$  and  $F_j$ .

6. (Original) Method according to Claim 5, characterized in that the size of a fragment is the number of pixels included in this fragment.

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7. (Previously Presented) Method according to Claim 1, characterized in that factor B is proportional to  $[(Y_i - Y_j)^2 + (U_i - U_j)^2 + (V_i - V_j)^2]$ , where  $(Y_i - Y_j)$ ,  $(U_i - U_j)$  and  $(V_i - V_j)$  represent, respectively, the difference between the luminances and the blue and red colour signals of each of these two fragments.

8. (Original) Method of grouping fragments of an image which are obtained by a method according to Claim 1, characterized in that this grouping uses a model (24<sub>i</sub>) of motion individual to each fragment F<sub>i</sub>, this model (24<sub>i</sub>) of motion being determined with a known error or variance (Var<sub>24i</sub>) so as to allocate to the fragment created by this grouping one and the same model (24<sub>k</sub>) of motion, grouping together at each step of this method the fragments F<sub>i</sub> and F<sub>j</sub> which minimize a grouping cost C<sub>re</sub> proportional to an evaluation (Δ<sub>ij</sub>) of the difference between the models (24<sub>i</sub>, 24<sub>j</sub>) of motion of the two fragments F<sub>i</sub> and F<sub>j</sub>.

9. (Original) Method according to Claim 8, characterized in that the grouping cost (C<sub>re</sub>) is inversely proportional to a S<sub>re</sub> of motion such that, in the absence of any other stoppage test, the grouping is not allowed if the evaluation Δ<sub>ij</sub> is greater than this threshold S<sub>re</sub>.

10. (Original) Method according to Claim 9, characterized in that the grouping cost C<sub>re</sub> is calculated according to the formula:  $C_{re} = [(N_i \times N_j) / (N_i + N_j)] [(\Delta_{ij}) / S_{re}]$ , where N<sub>i</sub> is the number of pixels of the fragment F<sub>i</sub> and N<sub>j</sub> is the number of pixels of the fragment F<sub>j</sub>.

11. (Previously Presented) Method according to Claim 8, characterized in that the fragmentation F<sub>j</sub> being of a greater size than the size of fragment F<sub>i</sub>, the evaluation Δ<sub>ij</sub> of the difference in motion between these fragments F<sub>i</sub> and F<sub>j</sub> comprises the following steps:

- calculation of a motion vector (15<sub>pj/i</sub>) for each pixel P(x,y) of the fragment F<sub>j</sub> according to the model 24<sub>i</sub> with parameters (a<sub>i</sub>, b<sub>i</sub>, c<sub>i</sub>, d<sub>i</sub>, e<sub>i</sub>, f<sub>i</sub>) of motion of the fragment F<sub>i</sub>, in such a way that, for a pixel P with coordinates (x<sub>j</sub>, y<sub>j</sub>) of F<sub>j</sub>, we calculate a vector 15<sub>pj/i</sub> with coordinates (d<sub>xj/i</sub>, d<sub>yj/i</sub>) according to the following formulae:

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$$d_{xj/i} = a_i + b_i x_j + c_i y_j$$

$$d_{yj/i} = d_i + e_i x_j + f_i y_j$$

- evaluation of the motion vector  $15_{pj/i}$  of this pixel P according to the model 24<sub>j</sub> with parameters  $(a_i, b_i, c_i, d_i, e_i, f_i)$  of this fragment  $F_j$ , that is to say

$$d_{xj/j} = a_j + b_j x_j + c_j y_j \text{ and}$$

$$d_{yj/j} = d_j + e_j x_j + f_j y_j$$

-evaluation of the difference  $\Delta p_{ji}$  between these two vectors  $15_{pi/i}$  and  $15_{pj/j}$  by calculating

$$\Delta p_{ji} = (d_{xj/j} - d_{xj/i} - d_{xj/i})^2 + (d_{yj/j} - d_{yj/i} - d_{yj/i})^2$$

-evaluation  $\Delta_{ji}$  of the difference in motion between fragments  $F_i$  and  $F_j$  by summing the  $\Delta p_{ji}$  values of all the pixels of the fragment  $F_j$  and then dividing by the number of pixels  $N_j$  of the fragment  $F_j$ .

12. (Original) Method according to Claim 11, characterized in that the size of a fragment is defined as the number of pixels included in this fragment.

13. (Original) Method according to Claim 9, characterized in that the grouping threshold  $S_{re}$  is proportional to an error or variance  $\text{Var}_{24i}$  of the modeling (24<sub>i</sub>) of motion of the fragment  $F_i$ .

14. (Previously Presented) Method according to Claim 9, characterized in that the grouping threshold  $S_{re}$  is proportional to the maximum  $\text{Max}(\text{Var}_{24i}, \text{Var}_m)$  between the variance ( $\text{Var}_{24i}$ ) of the model (24<sub>i</sub>) of motion of the fragment  $F_i$  and the mean ( $\text{Var}_m$ ) of the variances of the models of motion of fragments of the image, and equal to  $0.5 * \text{Max}(\text{Var}_{24i}, \text{Var}_m)$ .

15. (Original) Method according to Claim 13, characterized in that the grouping threshold  $S_{re}$  is higher, the grouping thus being less selective, when fragments whose pixels were included in one and the same region of a previous image are grouped together

16. (Original) Method according to Claim 11, characterized in that a luminance

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prediction test is used before applying a less selective grouping threshold  $S_{re}$ .

17. (Original) Method according to Claim 16, characterized in that the fragment  $F_j$  being of a greater size than the size of the fragment  $F_i$ , the luminance prediction is performed by calculating, for each pixel  $P$  with coordinates  $(X_j, Y_j)$  of the fragment  $F_j$ , the vector  $15p_{ji}$  with coordinates  $(dx_{ji}, dy_{ji})$ , the luminance predicted at  $P (X_j, Y_j)$  in the current image being that found at  $(X_j - dx_{ji}, Y_j - dy_{ji})$  in the previous image.

18. (Original) Method according to Claim 8, characterized in that the grouping of fragments into regions of arbitrary size  $N_{min}$  is encouraged by using a grouping stoppage test using the grouping cost  $C_{re}$  multiplied by a coefficient such that, calling  $N'_i$  the maximum between the number  $N_i$  of pixels of the fragment  $F_i$  and  $N_{min}$ , and  $N'_j$  the maximum between the number  $N_j$  of pixels of the fragment  $F_j$  and  $N_{min}$ , we use the stoppage test:

$$\frac{N_i + N'_j}{C_{re}(F_i \cup F_j) * N_i * N'_j} > 1$$

19. (Original) Method according to Claim. 8, characterized in that we use the grouping stoppage criterion:

$$C_{re}(F_i \cup F_j) > 1.$$